Design and validation of the Lifestyle Screening Questionnaire in Adolescents (LSQA)

Diseño y validación del Cuestionario de Cribado de Estilos de Vida en Adolescentes (CCESVA)

Authors

Sonia Olivera-Sánchez [1,2]
Ana Pablos [3*]
Laura Elvira [3]
Eraci Drehmer [3]
Jose F. Guzmán [4]

[1] Universidad Católica de Valencia San Vicente Mártir (Spain)
[2] Vives University Sciences Applied (Belgium)
[3] Universidad Católica de Valencia San Vicente Mártir (Spain)
[4] Universidad de Valencia (Spain)
* Co-first author

Corresponding author:
Sonia Olivera
Sonia.olivera@mail.ucv.es
Sonia.oliverasanchez@vives.be

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Abstract

Introduction and objective: In the literature, various questionnaires and surveys have been developed to assess adolescents' lifestyles; however, the vast majority require a long time to administer, making their use in school environments complicated. This study focuses on designing and validating the Lifestyle Screening Questionnaire for Adolescents (LSQA).
Methodology: The LSQA was administered to 603 Spanish adolescents and re-administered after 15 days. The Global School Health Survey (GSHS) was also administered. Content validity (Content Validity Coefficient, CVC) and criterion validity (Spearman correlations) were used to assess validity. Reliability was evaluated using test-retest methods (Spearman correlation), and the internal consistency of the questionnaire was evaluated using Cronbach's alpha and intraclass correlation coefficients (ICC).
Results: Content validity was assessed by a panel of experts, with a CVC greater than 0.900 in all cases, demonstrating excellent validity and agreement. Criterion validity showed that the instrument measures relevant constructs consistent with the GSHS dimensions. Internal consistency was considered satisfactory ($\alpha = 0.540–0.882$) with an ICC > 0.50. Test-retest reliability demonstrated good stability ($r > 0.50$). The final questionnaire included seven dimensions and 56 items.
Conclusions: The findings support the use of LSQA as a valid and reliable tool for assessing habits and lifestyles in adolescents.

Keywords

Adolescent health; questionnaire; psychometric evaluation; lifestyle assessment.

Resumen

Introducción y objetivo: En la literatura se han desarrollado diversos cuestionarios y encuestas para evaluar los estilos de vida de los adolescentes, pero la gran mayoría requieren un tiempo prolongado de aplicación, [anónimo]lo que su uso en entornos escolares es complicado. Este estudio se centra en el diseño y validación del Cuestionario de Cribado de Estilo de Vida en Adolescentes (CCESVA).
Metodología: El CCESVA fue administrado a una muestra de 603 adolescentes españoles y reaplicado a los 15 días. También se utilizó el Global School Health Survey (GSHS). Para evaluar la validez, se emplearon métodos de validez de contenido (Coeficiente de Validez de Contenido, CVC) y de criterio (correlaciones de Spearman). Para medir la fiabilidad, se llevaron a cabo pruebas de test-retest (correlación de Spearman), y la consistencia interna del cuestionario se evaluó mediante el alfa de Cronbach y los coeficientes de correlación intraclase (CCI).
Resultados: La validez de contenido fue determinada por un panel de expertos, obteniendo un CVC superior a 0.900 en todos los casos, lo que demuestra una excelente validez y concordancia. La validez de criterio evidenció que el instrumento mide constructos relevantes coherentes con las dimensiones del GSHS. La consistencia interna se consideró satisfactoria ($\alpha = 0.540–0.882$) con un CCI>0.50. La fiabilidad test-retest mostró buena estabilidad ($r > 0.50$). El cuestionario final incluyó 7 dimensiones y 56 ítems.
Conclusiones: Los hallazgos respaldan el uso del CCESVA como una herramienta válida y fiable para la evaluación de los hábitos y estilos de vida en adolescentes.

Palabras clave

Salud adolescente; cuestionario; evaluación psicométrica; evaluación del estilo de vida.

Introduction

In recent decades, there has been a significant increase in the prevalence of various diseases linked to school-related lifestyle factors, highlighting the critical importance of monitoring and understanding adolescent habits. Adolescence, the period between the ages of 10 and 19, is a stage characterized by profound psychological and physiological changes that significantly impact future development and health (Megías & Ballesteros, 2019; Rojo-Ramos et al., 2024). This crucial phase of life offers a unique opportunity to shape habits that will influence long-term health, emphasizing the need for thorough monitoring and early intervention in adolescent health.

During school age, adolescents adopt behaviors and habits that may have long-lasting consequences for their health. A healthy lifestyle during this stage contributes to optimal physical development and the prevention of chronic diseases in adulthood. Proper nutrition is essential; a balanced diet promotes healthy growth and helps prevent metabolic diseases such as obesity and type 2 diabetes while enhancing academic performance and mental health (Moreno et al., 2005). Regular physical activity is equally important, as it fosters a healthy body weight, improves cardiovascular and mental health, and prevents disorders related to sedentary behavior, such as depression and anxiety (Mahindru et al., 2023).

Sleep habits also play a crucial role in adolescents' overall well-being. Inadequate sleep is associated with concentration problems, higher accident risks, and mood disorders and can negatively affect academic performance and social behavior (Hirshkowitz et al., 2015). Additionally, early exposure to harmful substances such as alcohol, tobacco, and recreational drugs, as well as risky behaviors like gambling and unsafe sexual practices, can have lasting detrimental effects on physical and emotional development (Musaad et al., 2017). These behaviors not only lead to immediate health issues but also increase the risk of addiction and chronic diseases in the future.

The social and family context also plays a fundamental role in shaping these habits. Parental education and the family environment significantly influence adolescents' decisions regarding food, exercise, and substance use (Leyton-Román et al., 2021). Educational policies and interventions in the school environment can help promote healthy behaviors and provide a supportive framework for young people.

The COVID-19 pandemic has exacerbated many of these problems, as confinement and the transition to virtual learning have led to increased sedentary behavior and decreased physical activity. Long periods in front of screens and reduced social interaction have negatively impacted adolescents' physical and mental health, increasing the risk of obesity, sleep disorders, and mental health issues (Pérez-Escamilla et al., 2020). This context has underscored the need for more robust evaluation tools adapted to the new realities of young people.

Various questionnaires and surveys have been developed to assess adolescent lifestyles in the literature. The CASERIA program, for example, examines dietary habits, physical exercise, sedentary behavior, substance use, mental health, and other factors in schoolchildren aged 10 to 14 years. Similarly, the ALADINO study and CAFE questionnaire provide scales for a comprehensive assessment of children's health (García-Solano et al., 2021; Rodríguez-Lorenzo & Toro, 2020).

Several validated instruments are widely used for studying adolescent health behaviors. The Health Promoting Lifestyle Profile (HPLP) is a well-established tool in health behavior research, with validated versions in multiple languages (Walker et al., 1987). The Healthy Lifestyle Questionnaire is frequently employed in public health studies and lifestyle intervention programs (Gálvez et al., 2015). Additionally, the Health Behavior in School-aged Children (HBSC) Survey (Inchley et al., 2020) and the Youth Risk Behavior Surveillance System (YRBSS) (Brener et al., 2024) are internationally recognized tools that facilitate large-scale data collection on adolescent health, particularly in risk behavior research (WHO, 2019a).

However, despite the wide use of these instruments, many existing questionnaires suffer from limitations that have an impact on their practical application. Some require long completion times, which may be impractical for widespread use in school settings where time constraints are an important factor (Bauman et al., 2012). These lengthy assessments may discourage participation or reduce the accuracy of responses due to fatigue or lack of engagement (Beranuy et al., 2020; Brener et al., 2024). Other questionnaires focus on children only or require local adaptations, as their application in Europe may be limited due to cultural and contextual differences (Inchley et al., 2020).

In response to these needs, LSQA was developed as a concise and easy-to-administer screening tool designed for efficient use in school settings. Its goal is to ensure higher response rates, reduce participant burden, and facilitate timely and effective data collection essential for adolescent health interventions. Moreover, the instrument aims to provide a more comprehensive assessment tailored to the characteristics of the European context, addressing lifestyle aspects of adolescents that are not fully covered by existing questionnaires. The LSQA seeks to fill this gap in risk factor assessment, offering a practical and valuable tool for both educational and healthcare environments to enable more accurate identification and more effective intervention in adolescent health (Leyton-Román et al., 2021).

Based on this, the objective of the present study was the design and validation of a screening questionnaire to study healthy lifestyles and habits in adolescents.

Methodology

To design and validate the LSQA, a quantitative psychometric methodology was employed. The methodology followed the framework established by Carretero-Dios and Pérez (2005, 2007) and was carried out in five stages: 1) Theoretical framework; 2) Item construction; 3) Content validity assessment; 4) Psychometric properties of the final instrument.

The study took place from January to March 2024 and was approved by the Research Ethics Committee of the Universidad Católica de Valencia San Vicente Mártir (UCV/2020-2021/080) by the principles of the Declaration of Helsinki.

Participants

For this study, five participant groups were defined, each playing a crucial role in the development, validation, and reliability calculation of the designed questionnaire:

- Coordinating Group (n=5): The team consisted of university professors actively involved in health promotion research. It included a coordinator with dual qualifications in psychology and medicine, a nurse, a specialist in primary physical education, a professional in physical activity and sport sciences, and a nutritionist. This team developed the initial questionnaire and supervised the study's implementation. They ensured proper adherence to methodological procedures, coordinated communication among stakeholders, and managed any issues arising during the research process.
- Expert Judges Group (n=11): For the content validity assessment, a panel of 11 expert judges was selected. The selection process followed the recommendations of Escobar & Cuervo (2008), who identify the following essential criteria for inclusion: experience, reputation, availability, motivation, impartiality and familiarity with the objective of the process and the subject under study. These experts, with backgrounds in nursing (1),, pediatrics (1), psychology (3), physical activity, nutrition (3), psychiatry (1), and social work (1), evaluated the relevance, clarity, and sufficiency of the questionnaire items, suggesting additional items where necessary. The group's consensus ensured that the questions accurately captured adolescent lifestyles and health risk factors.
- Pilot Study Participants Group (n=30): This group consisted of randomly selected adolescents, whose participation in the pilot phase was crucial to identifying potential issues in the questionnaire, such as unclear questions, length, and general comprehension. The inclusion criteria for this group were a) adolescents aged 12 to 18 years, b) secondary school students in any center in Spain, c) adolescents who signed the informed consent or informed assent (consent was obtained from parents or guardians in the case of those under 16 years of age) and c) young people who participated voluntarily. The exclusion criteria were a) adolescents with severe mental illnesses that hindered understanding or decision-making and b) adolescents with intellectual disabilities who could not adequately complete the questionnaire.
- Validation and Reliability Testing Group (n=603): A selected group of 603 adolescents participated in the final stage, which was essential for the statistical validation and reliability testing of the questionnaire. The sample size was calculated following Kline's (1994) guidelines, using a

ratio of 3 participants per item, ensuring a minimum sample size of 200 participants. The inclusion and exclusion criteria for this group were like the Pilot Study Group.

Procedure

Step I. Theoretical Framework

The LSQA questionnaire is based on public health theories, behavioral models, and psychosocial factors that influence adolescent lifestyle habits. It primarily draws from the Social-Ecological Model (Bronfenbrenner, 1979) which examines the interactions between individual factors and adolescents' living contexts (family, school, and community). Additionally, the Health Belief Model (Rosenstock, 1974) and the Theory of Planned Behavior (Ajzen, 1991) were incorporated to understand how beliefs about risks and perceptions of control influence health-related decision-making.

Step II. Construction of Items

The coordinating group constructed an initial version of the questionnaire based on an in-depth review of the scientific literature related to adolescent health and well-being. The items were organized into dimensions based on the purpose of each question. These initial dimensions included:

- Sociodemographic data (15 items)
- Physical activity (6 items)
- Sedentarism (4 items)
- Nutrition (10 items)
- Hygiene (6 items)
- Sleep (6 items)
- Risk behaviors (9 items)
- Perception of health (8 items)

All items, except for sociodemographic data, were answered on a Likert scale (1 = Strongly Disagree, 2 = Disagree, 3 = Neither Agree nor Disagree, 4 = Agree, and 5 = Strongly Agree).

Step III. Content Validity Assessment

The questionnaire was reviewed by a panel of 11 expert judges. The evaluation forms with instructions and the questionnaire were sent by e-mail and asked to be completed within 1 month. The responses evaluated the relevance, clarity, pertinence, and sufficiency of each dimension. The judges rated each item on a scale from 1 to 4 (1 = does not meet the criterion, 4 = fully meets the criterion). After evaluating the responses, the questionnaire was revised, reducing the number of items from 63 to 42 and adding five additional questions.

The content validity coefficient (CVC) was calculated to assess the agreement between the judges' ratings, ensuring that the instrument measured the construct it was intended to measure. The mean of the scores for each criterion and block was obtained according to the scores provided by the experts and their relationship with the maximum possible score for the component to subsequently make use of the formulas proposed by Hernández-Nieto (2011). The results were interpreted using the scale proposed by Hernández-Nieto (2002), and only the components that obtained a CVC greater than 0.80 were considered representative and valid for measuring the specific construct.

Once the final questionnaire was constructed, it was completed by a pilot group of adolescents (n=31) to analyze its comprehension. Participants were asked to identify any items they did not understand on their first reading, using a scale from 1 to 4 (1 = not understood, 4 = fully understood). Items that received unanimous responses indicating misunderstanding were eliminated or reformulated.

Step IV. Psychometric Properties of the LSQA

The final version of the LSQA was administered to a sample of adolescents from various schools in Spain (n=603). The test was conducted by a researcher and a schoolteacher during a one-hour tutoring session. Participants completed the questionnaire, and 15 days later, they completed the same test under

similar conditions. Internal consistency and test-retest reliability were calculated. Criterion validity was assessed by comparing the LSQA results with those of the Global School Student Health Survey (GSHS), developed by the World Health Organization (WHO) with technical assistance from the U.S. Centers for Disease Control and Prevention. The GSHS consists of 10 core questionnaire modules, and each module contains between 3 and 7 items. To compare with the LSQA, 8 of these questionnaire modules were used: a) Alcohol Use Module (item number 2), b) Dietary Behaviors Module (items number 4, 5 and 6), c) Drug Use Module (items number 2 and 4), d) Hygiene Module (items number 1, 2, 3, and 4), e) Physical Activity Module (item number 1), f) Sexual Behaviors Module (item number 4), g) Tobacco Use Module (items number 2 and 3), h) Violence and Unintentional Injury Module (item number 5) (WHO, 2019b).

Body mass index (BMI) measurements were also taken, and self-reported BMI from the LSQA was compared with anthropometric measurements. Body weight was measured with a Seca 714 scale (Seca Vogel & Halke GmbH & Co. KG, Hamburg, Germany), with an accuracy of 0.01 kg; body stature was measured by attaching a Seca scale to the scale, with an accuracy of 0.1 cm. The protocols followed were those established by the International Society for the Advancement of Kin anthropometry (ISAK), and all the data were taken by a qualified professional (ISAK Level I). Body mass index was calculated as weight (kg) divided by height squared (m^2).

Data Analysis

All data were analyzed using SPSS Statistics Version 21.0 (SPSS Inc., Chicago, IL) and Microsoft Excel 2010, Version 16 (Microsoft Corporation, Redmond, WA).

The psychometric properties of the LSQA, including internal consistency and test-retest reliability, were evaluated using the statistical methods outlined above.

The internal consistency of the LSQA was tested using Cronbach's alpha coefficient and intraclass correlation coefficient (ICC). An alpha value above 0.7 indicated good internal consistency (Rattray & Jones,2007). ICC values below 0.5 indicate poor reliability, between 0.5 and 0.75 moderate reliability, between 0.75 and 0.9 good reliability, and any value above 0.9 indicates excellent reliability (Koo & Li, 2016).

The stability of the questionnaire over time was examined using the test-retest method, applying the nonparametric Spearman rank-order correlation coefficient (r) to compare test and retest responses. LSQA dimensions with r values greater than 0.50 were considered to demonstrate high reliability (Kuckartz et al., 2013).

Results

Content Validity Assessment

The results from the validation by judges for each dimension and their respective blocks and criteria were analyzed. The scores obtained in the validation can be seen in Table 1, which demonstrates an excellent validity and agreement.

Table1. Content validity coefficient for LSQA Dimensions

Dimension	Sufficiency (CVC)	Coherence (CVC)	Relevance (CVC)	Clarity (CVC)
Physical Activity & Sedentarism	0.999	0.926	0.973	0.999
Nutrition & Hydration	0.962	0.987	0.993	0.962
Hygiene	0.999	0.937	0.999	0.999
Risk Behaviors	0.985	0.937	0.978	0.985
Sleep	0.968	0.999	0.957	0.968
Perception of Health	0.968	0.924	0.974	0.968

Note: CVC: content validity coefficient

Based on these results, the final version of the LSQA questionnaire was structured as shown in Table 2 and Figure 1.

Table 2. LSQA structure

Blocks	Dimensions	Description	Items
Personal Data	Sociodemographic Data	Sociodemographic information of the participant, including age, gender, etc.	1-13
Healthy Lifestyle Habits Factors	Physical Activity	Evaluates frequency, type, duration, and intensity of physical activity among adolescents. It also measures daily sedentary hours and screen time.	14-19
	Nutrition	Analyzes eating habits, including the variety and quality of foods consumed.	20-29
	Hygiene	Evaluates personal hygiene practices such as handwashing, dental care, and general hygiene habits.	30-33
	Risk Behavior	Examines the engagement of adolescents in behaviors that may negatively impact their health, such as poor dietary habits, insufficient physical activity, substance use, and other risky lifestyle choices.	35-42
	Sleep	Assesses the amount and quality of sleep, along with rest habits.	43-48
General Well-being Factors	Health Perception	Measures adolescents' self-assessment of their general health and well-being.	49-56

The sociodemographic items are mostly closed-ended, with three open-ended questions (height, weight, and date of birth). The rest of the items use a 5-point Likert scale (1 = "Strongly Disagree" and 5 = "Strongly Agree"). A total of 23 reversed items are included, formulated in opposition to the trend of other questions. These items are essential for detecting automatic responses, as reversed wording prevents respondents from automatically selecting the same option for all items, encouraging more careful reflection on each statement. Additionally, the inclusion of reversed items may increase the instrument's validity, providing a more accurate assessment of the construct being measured and helping to balance the scale to avoid any biased direction in the responses.

Table 3 displays the inter-correlations between the six LSQA dimensions. The six variables tap similar but not completely overlapping domains.

Table 3. Spearman correlation matrix between LSQA dimensions

Variables	1	2	3	4	5	6
1. Physical Activity	1.000					
2. Nutrition	0.314**	1.000				
3. Hygiene	0.272**	0.387**	1.000			
4. Risk Behavior	0.059	0.280**	0.171**	1.000		
5. Sleep	0.097*	0.208**	0.027	0.253**	1.000	
6. Health Perception	0.364**	0.313**	0.210**	0.212**	0.344**	1.000

Note: *Correlation is significant at the 0.05 level **Correlation is significant at the 0.001 level (2-tailed).

Table 4. LSQA items in the Spanish version

Ítem	Respuesta
Datos sociodemográficos	
1.- Mi edad	___ Años __Meses
2.- Mi estatura	_____ cm
3.- Mi peso	_____ kg
4.- Mi fecha de nacimiento	_____
5.- Género	☐ Hombre ☐ Mujer ☐ Otro
6.- Situación de residencia en España	☐ Residente Español ☐ Residente procedente de la UE ☐ Residente procedente de otros países (no UE)
7.- Procedencia	☐ España ☐ Norte de África ☐ América Central y Sudamérica ☐ Rusia y Europa del Este ☐ África Central y Subsahariana ☐ China ☐ India ☐ Otra (especifique):
8.- Centro escolar	☐ Privado ☐ Público ☐ Concertado
9.- Nivel académico actual	☐ Primaria: ☐ 5º ☐ 6º ☐ Secundaria: ☐ 1º ☐ 2º ☐ 3º ☐ 4º ☐ Bachillerato: ☐ 1º ☐ 2º ☐ Ciclo Formativo: ☐ 1º ☐ 2º ☐ Grado Universitario: ☐ 1º ☐ 2º ☐ 3º ☐ 4º
10.- Nivel educativo alcanzado por el padre	☐ Sin educación formal ☐ Primaria ☐ Secundaria ☐ Formación Profesional (F.P.) Grado Medio ☐ Formación Profesional (F.P.) Grado Superior ☐ Grado Universitario ☐ Posgrado (Máster o Doctorado)
11.- Nivel educativo alcanzado por la madre	☐ Sin educación formal ☐ Primaria ☐ Secundaria ☐ Formación Profesional (F.P.) Grado Medio ☐ Formación Profesional (F.P.) Grado Superior ☐ Grado Universitario ☐ Posgrado (Máster o Doctorado)
12/13.- Ocupación laboral	Padre: _____ Madre: _____
Ítem	
Actividad Física y Sedentarismo	
1.- En mi tiempo libre, practico al menos dos días por semana ejercicio físico intenso como el atletismo, fútbol o baile.	
2.- Durante el patio o en mi tiempo de descanso, realizo actividades diariamente que requieren movimiento, como juegos de pillar, andar, pasear o fútbol, entre otras, y no estoy sentado.	

	3.- Practico al menos una hora al día actividad física moderada como andar, ir a clase a pie, en bicicleta, patines o patinete (no eléctrico), pasear al perro, etc. 4.- Los fines de semana realizo actividad física como hacer excursiones, montar en bicicleta, actividades de playa, montaña, participar en competiciones deportivas, etc. 5.- Todos los días paso al menos 2 horas al día realizando actividades de pantalla, como por ejemplo ver la TV, jugar con la consola, con el móvil, etc. 6.- Todos los días después del colegio/instituto/universidad realizo, por lo menos, 1 hora de actividades extraescolares en las que estoy sentado, como inglés, dibujo, guitarra, etc. u otro tipo de actividades sedentarias.
Alimentación e hidratación	1.- Bebo diariamente agua entre las comidas o mientras hago actividades, aunque no tenga sed. 2.- Como diariamente 5 porciones de fruta, ensalada y/o plato con verduras. 3.- Como, al menos tres días a la semana, carne roja (vacuno-ternera, cordero, caballo, etc.) o embutidos (chorizo, jamón, morcilla, longaniza, etc.) 4.- Realizo, al menos, 4 o 5 comidas durante el día. 5.- Como, al menos dos veces a la semana, comida rápida (hamburguesas, kebabs, etc.), alimentos fritos (como patatas fritas, o croquetas) y/o snacks (lays, pelotazos, cacahuetes, saladitos, etc.) 6.- En el desayuno tomo siempre proteínas (como leche, yogurt, queso, huevo, jamón, etc.), cereales (como pan) y fruta o zumos naturales. 7.- Como, al menos tres días a la semana, huevos o legumbres (como lentejas, garbanzos, alubias o guisantes). 8.- Como, al menos tres días a la semana, pescado y carnes blancas (como pollo, pavo o cerdo) 9.- Todos los días tomo zumos de brick o envasados, bebidas tipo refrescos. 10.- Todos los días tomo dulces elaborados (caramelos, bollería, pasteles o chocolate).
Higiene	1.- Me ducho diariamente y después de hacer ejercicio. 2.- Me cambio la ropa interior todos los días. 3.- Me lavo los dientes al menos 2 veces al día.) 4.- Habitualmente me lavo las manos antes de comer y después de ir al baño.
Conductas de riesgo	1.- He fumado, al menos un cigarrillo, en los últimos 7 días. 2.- He bebido alguna bebida alcohólica en los últimos 7 días. 3.-He consumido alguna droga (marihuana, cocaína, inhalantes, heroína, metanfetaminas, éxtasis, alucinógenos, esteroides, etc.) en el último mes. 4.- He mantenido relaciones sexuales sin protección en el último mes. 5.- He apostado o jugado dinero en el último mes (apuestas deportivas, online) 6.- He estado en una pelea física o a través de redes sociales con otros jóvenes en los últimos 12 meses. 7.- Alguna vez he intimidado o insultado a algún compañero en persona o mediante redes sociales (Instagram, TikTok, etc.). 8.- Me he sentido intimidado por algún compañero en persona o mediante redes sociales (Instagram, TikTok, etc.). 9.- Me he saltado alguna comida o he tomado laxantes o he vomitado con el fin de perder peso.
Descanso nocturno	1.- Duermo diariamente entre 8 y 10 horas (horas de sueño entre los 12 y 18 años). Duermo diariamente entre 10 y 12 horas (horas de sueño entre los 10 y 12 años). . 2.- Tengo problemas todos los días para dormirme, permanezco bastante rato despierto en la cama. 3.-Me despierto diariamente cuando estoy dormido (para ir a beber agua o al baño) y luego me cuesta volver a dormirme. 4.- Estoy, al menos 1 hora, viendo la televisión, móvil, ordenador o Tablet, justo antes de ir a dormir. 5.- Pierdo horas de sueño por conectarme a las redes, jugar a videojuegos o ver series. 6.- Me despierto por la mañana con la sensación de haber descansado lo suficiente.
Percepción de salud	1.- Me siento frecuentemente deprimido o triste. 2.- Me siento frecuentemente preocupado, nervioso o ansioso. 3.- Cuando me miro en el espejo, me gusta mi aspecto físico. 4.- Prefiero conocer a gente a través de videojuegos o redes sociales que en el colegio/instituto/universidad. 5.- Me dejo llevar fácilmente por mis amigos, aunque no esté de acuerdo. 6.- Me gusta tomar decisiones y tener iniciativa. 7.- Intento ver casi siempre la parte "buena" de las cosas o situaciones. 8.- Siento que debería cambiar algún hábito (hacer más deporte, dejar de fumar, etc.) y cuidar más mi salud.

Finally, the analysis carried out on the pilot group (n=31) to analyze their understanding of the questionnaire revealed that 100% of the sample confirmed that the questions were perfectly understood and did not require any rewording. Furthermore, no participant indicated any doubts regarding the completion of the LSQA.

Regarding the time taken to fill in the questionnaire, the average time the young people took was 9.26 (±3.04).

Criterion validity

The self-reported Body Mass Index (BMI) was compared to the BMI obtained through anthropometric measurements. The results showed a strong correlation ($r(45) = 0.910$, $p < 0.01$), indicating that self-reported BMI is a valid measure compared to anthropometric assessment. Additionally, the different dimensions of the LSQA were compared with corresponding items from the Global School Health Survey

(GSHS). Significant correlations were found across all dimensions (Table 5). Item 6 of the dietary behavior module and all risk behavior-related items showed negative correlations due to their inverted scoring. These findings support the criterion validity of the LSQA, confirming that the instrument effectively measures relevant constructs consistent with other validated surveys such as the GSHS.

Table 5. Spearman correlation matrix between LSQA dimensions and GSHS items by module.

GSHS Modules (ítem)	LSQA Dimensions :			
	Physical activity	Nutrition	Hygiene	Risk Behavior
PAM (1)	0.455**			
DBM (4)		0.351**		
DBM (5)		0.246**		
DBM (6)		-0.318**		
HM (1)			0.351**	
HM (2)			0.327**	
HM (3)			0.312**	
HM (4)			0.359**	
AUM (2)				-0.421**
DUM (2)				-0.459**
DUM (4)				-0.220**
SBM (4)				-0.446**
SBM (46)				-0.451**
TUM (2)				-0.326**
TUM (3)				-0.104**
VM (5)				-0.294**

Note: PAM: Physical Activity Module; DBM: Dietary Behavior Module; HM: Hygiene Module; AUM: Alcohol Use Module; DUM: Drug Use Module; SBM: Sexual Behaviors Module; VM: Violence Module

Internal Consistency

Table 6 reports Cronbach's alpha values and Intraclass Correlation Coefficients for the six LSQA dimensions. The Cronbach's alpha values ranged from 0.540 to 0.882. The dimensions of physical activity, nutrition, hygiene, and risk behavior showed acceptable reliability, while the dimensions of sleep and health perception exhibited medium reliability. However, the ICC indicated moderate or good agreement across all cases within the same dimension.

Table 6. Internal consistency and intraclass correlation coefficient for the 6 LSQA dimensions

Dimensions	Cronbach's α	ICC	95% CI for ICC
Physical Activity	0.727	0.698	0.642-0.744
Nutrition	0.763	0.710	0.647-0.760
Hygiene	0.882	0.878	0.859-0.894
Risk Perception	0.775	0.773	0.744-0.800
Sleep	0.540	0.505	0.430-0.572
Health Perception	0.609	0.576	0.513-0.632

Test-Retest Reliability

Table 7 presents the Spearman Correlation values calculated for the test-retest reliability of the LSQA dimensions. They show r-values greater than 0.50 and are therefore considered very reliable, and values indicate good stability of the questionnaire over time. The results of the reliability of the questionnaire as a whole indicated good stability of the questionnaire (0.593).

Table 7. Test-Retest Reliability Using the Spearman Correlation

Dimensions	T1 Mean (SD)	T2 Mean (SD)	Spearman rho	
			r	p-value
Physical Activity	3.51 (0.85)	3.54 (0.75)	0.606	<0.001
Nutrition	3.35 (0.71)	3.45 (0.63)	0.558	<0.001
Hygiene	4.36 (0.92)	4.48 (0.73)	0.538	<0.001
Risk Behavior	4.34 (0.70)	4.44 (0.69)	0.622	<0.001
Sleep	3.11 (0.82)	3.13 (0.79)	0.588	<0.001
Health Perception	3.65 (0.66)	3.64 (0.63)	0.647	<0.001

Note: T1: Time 1; T2: Time 2; SD: Standard deviation

Discussion

The Lifestyle Screening Questionnaire in Adolescents (LSQA) was developed as a multidimensional tool to assess key lifestyle habits and perceived well-being among adolescents. The evidence obtained in this study provides strong support for its validity, reliability, and practical utility, establishing its relevance as a screening instrument in both educational and public health settings.

Theorical Framework and Dimensional Relevance

The selection of LSQA dimensions—physical activity, nutrition, hygiene, sleep, risk behaviors, and health perception—was guided by a comprehensive literature review and grounded in well-established theoretical models: the Social-Ecological Model (Bronfenbrenner, 1979), the Health Belief Model (Rosenstock, 1974), and the Theory of Planned Behavior (Ajzen, 1991). These frameworks support a multilevel understanding of health-related behavior, considering both individual and contextual determinants. This theoretical grounding justifies the multidimensional approach adopted by the LSQA, ensuring its alignment with current conceptualizations of adolescent health.

The content validity analysis confirmed the appropriateness of the included dimensions. All domains achieved content validity coefficients above 0.90, reflecting strong consensus among 11 experts on the relevance, clarity, sufficiency, and coherence of the items and the structure of the instrument. The two rounds of expert review and the extended time allowed for evaluation (one month) adhered to established methodological recommendations (Leal-Londoño et al., 2021), contributing to the instrument's conceptual and structural robustness.

The high content validity coefficients obtained across all domains not only affirm the overall robustness of the LSQA but also underscore the relevance of each individual dimension included in the instrument. The expert panel's evaluations confirmed that every dimension contributes meaningfully to capturing the multifaceted nature of adolescent health, ensuring both conceptual coherence and practical utility. This validation process supports the theoretical and empirical rationale behind each domain’s inclusion:

Physical Activity: This dimension assesses the frequency and intensity of adolescents' physical activity and its inclusion is crucial given the well-documented associations between physical activity and multiple benefits across physical, cognitive, and emotional domains (Mahindru et al., 2023). The high internal consistency ($\alpha = 0.882$) and significant correlations with external measures such as the GSHS and BMI reinforce its central role in identifying fitness levels and informing strategies to promote healthy behaviors in this age group

Nutrition: This domain evaluates dietary habits and the quality of adolescents' food intake, presenting solid internal consistency ($\alpha = 0.832$) and a strong correlation with BMI, which supports its capacity to reflect nutritional health accurately. Considering that eating patterns established during adolescence often persist into adulthood (Moreno et al., 2014), this dimension is key for early identification of dietary risks and for guiding preventive and educational interventions related to nutrition.

Hygiene: A dimension frequently overlooked in similar instruments, hygiene addresses everyday self-care practices that are essential for the prevention of illness and the promotion of well-being (Aiello et al., 2008). Including this aspect broadens the scope of the LSQA by highlighting behaviors that contribute to physical and social health and reinforces the instrument's utility as a tool for comprehensive health education

Sleep: Despite showing a more moderate internal consistency ($\alpha = 0.540$), this domain remains essential due to the pivotal role of sleep in physical development, emotional regulation, and academic functioning (Minges & Redeker, 2016). Given its multifactorial nature—shaped by stress, screen exposure, and academic pressure—it is inherently difficult to assess consistently, yet its inclusion enables the detection of imbalances that may otherwise go unnoticed and that are often precursors of broader health issues.

Risk Behaviors: This dimension explores the presence of potentially harmful behaviors such as substance use and holds strong internal consistency ($\alpha = 0.727$) alongside significant negative correlations with perceived health (Kann et al., 2018). Its inclusion is critical for early detection and timely intervention, as it provides actionable insights into behaviors that, if not addressed, could escalate into more severe health conditions during adolescence or in later stages of life

Health Perception: This subjective domain reflects adolescents' overall evaluation of their health and, despite presenting lower internal consistency (α = 0.609), it remains a well-established predictor of long-term health outcomes (Idler & Benyamini, 1997). The strong negative correlations with risk behaviors such as tobacco, alcohol, and drug use underscore its relevance and its alignment with theoretical models that link self-perception to behavioral patterns, adding an essential emotional and cognitive dimension to the health assessment provided by the LSQA (Breidablik, Meland, & Lydersen, 2008).

Psychometric Properties and Internal Consistency

From a psychometric perspective, the dimensions of physical activity, nutrition, hygiene, and risk behavior showed acceptable to high internal consistency (α = 0.727–0.882), reflecting good internal homogeneity of the items. Although the sleep (α = 0.540) and health perception (α = 0.609) domains yielded more moderate alpha values, this outcome aligns with prior findings that highlight the subjective and multifactorial nature of these constructs, especially in adolescent populations (Minges & Redeker, 2011; Pharthasarathy et al., 2018). Previous research has highlighted the challenges of reliably assessing adolescents' sleep patterns and health perceptions due to the complexity of these constructs (Minges & Redeker, 2011; Pharthasarathy et al., 2018). For example, sleep is influenced by various factors, such as stress, screen time, and academic pressure, making it a more challenging construct to capture consistently in survey instruments. Additionally, the intraclass correlation coefficients indicated moderate to good reliability across all dimensions, reinforcing the instrument's stability.

In terms of temporal stability, all dimensions demonstrated test–retest reliability coefficients above 0.50 (Spearman's rho), and the global reliability coefficient was 0.593. These results support the LSQA's reliability for longitudinal use, particularly in educational environments where repeated assessments may be needed to monitor behavioral trends over time.

Criterion Validity and External Comparisons

The appropriateness of the dimensions is further supported by the criterion validity findings. Significant and theoretically consistent correlations were observed between the LSQA dimensions and corresponding items from the Global School-based Student Health Survey (GSHS). These results reinforce the instrument's convergent validity and alignment with internationally recognized standards for adolescent health monitoring. For example, it was found a significant correlation between self-reported BMI from the LSQA and BMI measured with the Tanita scale ($r = 0.950$, $p < 0.01$). This strong correlation supports the instrument's accuracy in capturing adolescents' body mass status, a key indicator of health. As Kuczmarski et al. (2000) note, self-reported BMI data can be reliable, especially in large-scale surveys, when respondents accurately measure their height and weight. The LSQA's strong performance in comparison with the Tanita scale confirms that adolescents can reliably self-report their BMI. Given that BMI is a well-established measure of physical health (Mundy et al., 2022), this strengthens the tool's validity.

Additionally, the relationship between self-reported physical activity from the LSQA and the WHO's Global School Health Survey (GSHS) ($r = 0.184$, $p < 0.01$) suggests that LSQA adequately captures adolescent physical activity. Although the correlation is moderate, it is consistent with previous studies that have found similar correlations between self-reported and objective measures of physical activity (Bauman et al., 2012). This emphasizes the need to combine self-reported questionnaires with objective measures to gain a more accurate understanding of adolescent health behaviors. Biddle et al., (2011) highlight that self-reported measures, when combined with objective data, can provide valuable insights, further supporting the LSQA's utility in assessing adolescent physical activity.

The analysis also revealed significant negative correlations between health perception and risky behaviors such as tobacco use ($r = -0.678$, $p < 0.01$), alcohol consumption ($r = -0.573$, $p < 0.01$), and drug use ($r = -0.453$, $p < 0.01$). These findings are consistent with literature showing that adolescents who engage in risky behaviors often report poorer health perceptions (Kann et al., 2018). Moreover, the findings suggest that interventions aimed at reducing substance use among adolescents may not only improve physical health but also positively influence self-perception of health and well-being. This is especially important, as the health perception dimension of the LSQA aims to measure how adolescents evaluate their general health, a factor linked to long-term health outcomes (Kann et al., 2018).

Practical Applications

A distinguishing feature of the LSQA is its efficiency and ease of use. With an average completion time of less than 10 minutes, it offers clear advantages over other validated instruments, which often take longer to administer. For example, tools like the CAFJ require 10 to 15 minutes due to their detailed focus on physical activity and habits (Rodríguez-Lorenzo & Toro, 2020), while the EPS takes 5 to 10 minutes, focusing only on health perception (Gálvez et al., 2015). In comparison with other established tools for assessing health-related behaviors, such as GSHS (WHO, 2019a) and the CASERIA program (Rodríguez-Huertas et al., 2012), LSQA stands out for its speed and efficiency in administration. The GSHS and CASERIA often require more time and focus on a broader range of variables, which may limit their feasibility for frequent monitoring in fast-paced school environments. For instance, the GSHS typically takes longer due to its comprehensive approach to health behaviors and its focus on multiple domains of health (WHO, 2019b). Similarly, the CASERIA program requires more time because it delves into a wide array of health issues, making it more resource-intensive (Rodríguez-Huertas et al., 2019). In contrast, the LSQA strikes an optimal balance, allowing for regular use without overwhelming students or resources, ensuring schools can monitor adolescent well-being consistently without disrupting their schedules (Rodriguez-Fernandez et al., 2022). Consequently, LSQA offers a promising alternative for routine assessments, particularly when time constraints or resource limitations exist. Its ability to provide rapid, reliable results without compromising data quality makes LSQA an ideal tool for fostering healthier school environments, ultimately benefiting students' overall well-being.

Furthermore, LSQA's capacity to identify areas requiring immediate attention with both promptness and accuracy allows educators, counselors and health professionals to respond with focus and efficiency. This feature is particularly valuable in educational settings, where time and resources are often limited, and where early detection can make a significant difference in an adolescent's overall development. By identifying warning signs related to risk behaviors —such as poor nutrition, low physical activity, inadequate sleep patterns, or substance use—the LSQA serves as an initial screening tool that facilitates informed decision-making.

This allows students identified as at-risk to be promptly referred to appropriate resources, whether through more in-depth assessments by specialized teams, medical attention, psychological counseling, or family support. Early intervention is crucial for preventing minor issues from escalating into more serious and chronic conditions. Moreover, the LSQA not only serves a screening function but also acts as a foundation for designing specific interventions tailored to the individual needs of each student. These interventions may include educational workshops, changes in the school environment, or the development of programs that promote healthy habits.

In this regard, the LSQA becomes a strategic tool for improving adolescents' overall well-being, enabling a preventive, comprehensive, and evidence-based approach. By offering a holistic view of young people's health status and related behaviors, it fosters collaboration among the various stakeholders involved in their development: families, schools, the healthcare system, and the broader community.

In conclusion, the LSQA is a valid and reliable screening tool for assessing a broad range of health-related behaviors and perceptions in adolescents. Its high criterion validity, internal consistency in most domains, and stability over time make it a promising instrument for both research and intervention purposes. As a screening tool, LSQA can promptly identify key health issues in adolescents, enabling timely interventions.

Limitations and Future Directions

Despite its strengths, some limitations must be acknowledged. The lower reliability in the sleep and health perception domains suggests the need for refinement or expansion of item content to better capture these constructs. Furthermore, although the sample was broad and diverse within the Spanish context, cross-cultural validation is needed to confirm the instrument's applicability in other cultural and educational environments.

Future research should focus on evaluating the predictive validity of the LSQA, its responsiveness to change following interventions, and its relationship with academic performance and psychosocial well-being.

Conclusions

In summary, the LSQA is a valid, reliable, and efficient instrument for assessing a wide range of health-related behaviors and perceptions in adolescents. Its strong psychometric properties, theoretical foundation, and practical benefits make it an appropriate tool for both screening and intervention planning. With further refinement and broader validation, the LSQA has the potential to become a cornerstone in adolescent health monitoring and promotion efforts within educational and public health frameworks.

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Authors' and translators' details:

Sonia Olivera-Sánchez	sonia.olivera@mail.ucv.es	Author
Ana Pablos	ana.pablos@ucv.es	Author
Laura Elvira	laura.elvira@ucv.es	Author
Eraci Drehmer	eraci.drehmer@ucv.es	Author
José Guzmán	jose.F.Guzman@uv.es	Author
Sonia Olivera-Sánchez	sonia.olivera@mail.ucv.es	Translator